IMMUNOREHABILITATION OF PATIENTS AFTER COVID-19: POSSIBILITIES OF HALOAEROSOLTHERAPY

N. V. Vantiukh, O. I. Lemko, D. V. Reshetar

Government Institution "The Scientific-practical Medical Centre "Rehabilitation" Health Ministry of Ukraine", Uzhhorod, Ukraine

Abstract. One of the leading pathogenetic mechanisms of the disease caused by SARS-CoV-2 virus is inflammation, which is developing on the base of multicomponent immune disorders. In this regard, the topical issues are the study of the immune status peculiarities in patients who have recently suffered from COVID-19 and their possible correction under the influence of rehabilitation treatment, in particular with the use of haloaerosoltherapy (HAT).

The aim of the work is to investigate the influence of recovery treatment using HAT and singlet oxygen therapy (SOT) on the levels of pro- and anti-inflammatory cytokines, as well as cellular immunity indices in COVID-19 convalescents, depending on the applied treatment complex (TC) and the severity of the acute respiratory disease caused by SARS-CoV-2.

Materials and methods. 91 convalescents after COVID-19 aged 21-67 years were examined. In the acute period of the disease, patients were treated in the hospital and then they had a course of recovery treatment in the Scientific-Practical Medical Centre "Rehabilitation". As a control for laboratory indices, 24 practically healthy persons were examined. Cytokine status was studied by the determining the levels of pro-inflammatory and anti-inflammatory cytokines using immunoenzymatic method. Indices of cellular immunity were evaluated using an indirect immunofluorescence reaction with monoclonal antibodies ($CD3^+$, $CD22^+$, $CD4^+$, $CD8^+$, $CD16^+$) and on this basis, special indices were calculated that characterize the relations between the studied populations. Recovery treatment included two TCs on the base of HAT usage. The course of treatment according to TC-1 consisted of 18-20 HAT seances. In the TC-2 the course of HAT was supplemented with SOT.

Results. At the beginning of recovery treatment, all patients had pronounced disturbances in the cytokine balance on the account of high levels of pro-inflammatory cytokines, which was combined with significant changes in the T-cell immunity. These changes were observed both during the first month after COVID-19 and after 2-3 months, which determined the necessity for recovery treatment during the convalescence period. The applied treatment with the usage of HAT according to both TCs contributed to a certain improvement of cytokine ratios and cellular immunity indices, more pronounced in patients with a mild and moderate course of COVID-19.

Conclusions. In convalescents after acute respiratory disease caused by the SARS-CoV-2 virus, certain disturbances of the immune status remain, which are characterized by a significant decrease in the cellular immunity indices, which are associated by cytokine imbalance, which can be the basis for the development of post-covid syndrome and other chronic pathologies.

The course of rehabilitation treatment using HAT in convalescents after COVID-19 promoted to the inflammatory process activity decrease due to pro-inflammatory cytokines levels reduction and certain recovery of the cellular immunity, somewhat more pronounced when using HAT in combination with SOT, as well as in patients with mild and moderate course of the disease, compared to severe.

Key words: COVID-19, cytokine status, cellular immunity, recovery treatment, haloaerosoltherapy, singlet oxygen therapy.